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IS Research Perspective

Resource-Based Framework for IS Research: Knowledge Firms and Sustainability in Knowledge Markets*

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Abstract

The open and fragmented nature of IS research has spawned a vibrant debate about sustainability of the IS discipline. Intellectually stimulating and rooted in a rich repertoire of approaches, the debate is frequently polarized along a dialectical spectrum, where advocates take positions on appropriate boundaries and audiences for the discipline. With the objective of reframing this debate, and the hope of moving it forward, this paper develops a resource-based metaphorical model for IS research. We establish that disciplines can be viewed as analogous to contemporary firms, and thus, resource-based concepts for the sustainability of contemporary firms can be extended to examining the sustainability of knowledge firms. Our central proposition is that differences in "knowledge product" heterogeneity, when positioned appropriately with the market demand, can affect the sustainability of the IS firm. In resolving the issue of boundary conditions, our analysis suggests that the likelihood of IS outperforming other competing disciplines is feasible regardless of whether a distinct identity is forged. This relation is contingent on the ability of a knowledge firm to secure resources. Distinctness is required however, when a knowledge firm is unable to generate resources. Our analysis also indicates that the debate on audiences maybe misplaced. Beyond addressing the debate, however, we conclude that an inductive approach to research with a focus on addressing problems faced by emical markets is more likely to ensure sustainability when contrasted with other perspectives.

Keywords: *Identity crisis, core, disciplinary identity, disciplinary legitimacy, Information Systems, Resource-based View, MIS, IS research, relevance, rigor, metaphor, firms, markets*

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1. Introduction

Some argue that compared to other disciplines, the impact of IS research has been limited. Some further propose that IS is a "test bed" for theories from other disciplines, lacks core theories and concepts, and has in recent times experienced a decline in resources. The possibility of extinction has been raised (Agarwal and Lucas, 2005) and has sparked an intense debate about an identity crisis in the IS discipline. Much commentary has focused on contending the presence of a crisis, the pitfalls and merits of relying on other disciplines, and the appropriate audience for the IS discipline. While some researchers argue (Robey, 1996; DeSanctis, 2003) that being fluid, diverse, and serving a broad audience will resolve the crisis, others maintain that unless the IT artifact (Orlikowski, 2001) is explicit and we work toward serving a narrow IS audience (Hirschheim and Klein, 2003; Benbasat and Zmud, 2003), the crisis is unlikely to be resolved.

In line with the calls (Lyytinen and King, 2004) and ongoing efforts (Sidorova et. al, 2008; Rosemann and Vessey, 2008; Klein and Rowe, 2008) to address the concerns, our purpose is to analyze some issues not adequately addressed by existing commentaries. First, most of the debate centers on addressing the identity crisis in the discipline. In our estimate, less is said about the sustainability of the discipline. As Lyytinen and King (2004) have convincingly argued, both are important but distinct issues. In light of the limited discussion on sustainability, our primary intent is to *analyze the factors that lead to sustainability of disciplines.* Within the purview of this primary and broader objective, our purpose is also to examine some related questions.

Much of the discussion has centered around the intellectual capital (knowledge capital, the type, and the nature of knowledge the IS discipline should pursue). Scant attention is being paid to broader economic considerations that define and justify the growth of disciplines. Given the time it takes to build intellectual capital, this naturally raises the questions "How do we accelerate the buildup of intellectual capital?" and "How should we choose between the pursuit of intellectual capital and economic capital?"

Given the implicit connection between identity and extinction of the discipline in the received literature, "how do we explain the resources allocated to the IS discipline over three decades?" More generally, "how do disciplines survive when they have neither a core set of ideas, concepts, or theories nor a clear target audience?", "What resources do such disciplines possess, and where do these resources come from?"

Considerable disagreement exists among scholars about the audience, stakeholders, and constituents of the IS discipline. Opinions remain polarized regarding whether the practice community or the scholarly community should be the primary audience of the discipline. "Who should be the consumers of our research and why?", "What criteria and yardstick should we use to decide which constituents matter?". Also, given the connotation in received work that it is only possible to serve either the practice or the scholarly community, "Is it possible to serve both constituents?", and "What criteria or yardstick can we use to determine which constituents matter and when?"

The analysis in this paper is motivated by a need to respond to these questions. To address these issues, this paper frames disciplines as "knowledge firms" competing in a "knowledge-market" and develops a resource-based model for IS research. In using the Resource-Based View (RBV) to inform our analysis, we propose that knowledge firms compete against each other for resources that can be acquired from the knowledge market. In our framing of the problem, knowledge firms provide "products" in a knowledge market for buyers who, in turn, provide economic resources to knowledge firms and help sustain them. Our thesis is that — like contemporary firms — knowledge firms also compete against each other with resources, and asymmetries in these resources determine the extent of economic capital acquired and, consequently, the sustainability of knowledge firms.

In drawing a parallel between contemporary firms and disciplines, and using RBV as a lens to

analyze sustainability of disciplines, we do not intend to convey that disciplines are synonymous to firms. Rather, the use of RBV is based on the ideology that the focus of the theory and the implicit focus in the commentaries on the identity crisis converge on the problem of acquiring resources from the market. Concepts such as knowledge firms and RBV are used here in a metaphorical sense with the objective of identifying additional, equally relevant, and complementary causes that might cover some distance in forwarding the debate and addressing some of the aforesaid issues.

The balance of the paper is as follows: In Section 1 we first establish and make a case for use of the Knowledge Firm-Knowledge Market metaphor. We clarify the term knowledge markets and identify "buyers" important from a RBV standpoint. In Section 2, we clarify the nature of resources possessed by knowledge firms and propose a basic model that ties resources to the sustainability of knowledge firms. In Section 3 we make some tentative predictions about the sustainability of disciplines based on our model. In Section 4 we provide some policy implications for what can be done to achieve identity and sustainability for the IS discipline to address many of the issues motivating the study. Section 5 concludes the paper.

2. Approach and Assumptions

Any perspective on disciplinary identity relies on the assumptions and key tenets that form its basis. To the extent that these tenets and assumptions are realistic, further explanations and implications hold. This section presents three such aspects: key parameters of firm/market behavior, firm organization, and market dynamics. Our objective is to establish that a *synechdochic metaphor* exists— i.e., a subset of factors that allows us to draw a parallel between firms and disciplines so that concepts on the sustainability of the firm may be brought to bear in analyzing the sustainability of the knowledge firm (i.e., the discipline).

2.1. Behavioral Assumptions

We assume bounded rationality on the part of our economic actors, both on the firm and the market side. Bounded rationality entails that firms and markets are "intendedly rational but only limitedly so" (Simon, 1957, p. xxiv). As a second principal behavioral assumption, we believe that firms are resource-seeking, albeit within the limits of their bounded rationality. Under resource-seeking behavior, a firm X might opportunistically (or honestly) attempt to appropriate the products offered by Y (IS) so that market resources can be directed toward its own ends. Thus, for instance, X having seen the success enjoyed by Y, will attempt to imitate Y's products or seek to develop substitute products that are on par or superior to those offered by Y. In essence, X will attempt to fulfill the unmet market need and increase its own market share at the expense of Y. In the absence of resource-seeking behavior, other academic disciplines (competing suppliers) could simply perform a discreet market exchange with the IS discipline, i.e., each supplier affected by the pervasive nature of IT would use the knowledge products offered by Y and integrate then with their products. Thus, procuring the product in the market, as opposed to producing within the firm, will be the preferred mode of governance. Under resource-seeking behavior, however, as outlined, it might be better to develop the product in-house, and gain extra rents at the expense of IS (Y).

Of course due to limited cognitive abilities, markets cannot objectively determine if their needs are met, and disciplines cannot increase their market share at will by carrying out all activities within the firm. As outlined by Williamson (1985), knowledge articulation limits on the part of a firm might prevent the market from objectively determining the true relative value of products offered by the firm. For example, if Y produces a product designed to satisfy the unmet market demand, but is unable to articulate the value of the product in a language that can be understood by others, the net prospective gains using the product might be low or non-existent. Concomitantly, X will attempt to appropriate the IS discipline's (Y's) share of resources if the returns from offering IS products are substantially greater than the investment required to make them.

2.2. Disciplines as Purposively Adaptive Firms

Defining firm organization has been problematic in the theory of the firm literature (Alchian and

Demsetz, 1972; Coase, 1937; Conner and Prahalad, 1996; Masten, 1988; Nelson and Winter, 1982; Penrose, 1959; Simon, 1957). An essential element of the debate within economics is whether an authority relationship can be said to adequately represent firm organization. While Coase's (1937), authority-based classification might be intuitive and appealing, Masten (1988) points out a limitation. Suggesting that Coase's firm/market distinction as a matter of degree is at best incomplete, he holds that a firm represents a *distinct institution* in the constructive sense of the word. Firms denote a more established arrangement, a relationship or organization whose boundaries are defined. For Masten, distinctness is exemplified by virtue of the (shared routines, perspectives) peculiar rules and procedures that permit behavior within a firm. Parallel to the insights provided by Masten, recent work attempts to portray firms as a matter of the kind of rather than the degree of (*or presence of*), authority (Drucker, 1993; Micklethwait and Wooldridge, 1996; Nonaka et al., 2000; Spender and Grant, 1996).

Masten's argument that the fundamental difference between firms and markets is shared procedures in the former as opposed to autonomous adaptation in the latter has been endorsed elsewhere in Ghoshal and Moran's (1996) contemporary critique of transaction cost economics. Drawing upon Barnard (1938), they suggest that firms are characterized by "purposive" adaptation or shared purpose. Shared purpose implies that members move in some direction (which need not be either explicit or appropriate) and do so by exercising judgment in deciding which market signals to respond to and which to ignore. In other words, members of a firm have a common objective that differentiates them from others. For instance, such common objectives are implied in Benbasat and Zmud's (2003) plea for including more IT constructs in our research models, or their restricting IT research to certain topics, or in Agarwal and Lucas's (2005) discussion of including the IT context in future theorizing.

Following on the theoretical arguments presented, our intent is to define firm organization as a purposive adapter: One that does not necessarily hinge upon the presence of authority. A firm seen as a purposive adapter includes agents that share a similar stock of knowledge and attach the same meanings to their actions (Bijker et al., 1987; Scott, 1995). In reference to Weigelt and Camerer (1988), purposively adaptive firms imply shared subjective understanding among the different agents in the firm about a common accepted set of objectives. Continuing they hold that within a firm, it is possible for one agent to interpret the meaning of another:
"Interpretation is a process of perceiving the other and his or her interaction within symbolic frameworks so that we can make some sense out of what the other is doing…" (p.74)

Our specific conception of firm organization is diagrammed in Figure 1).

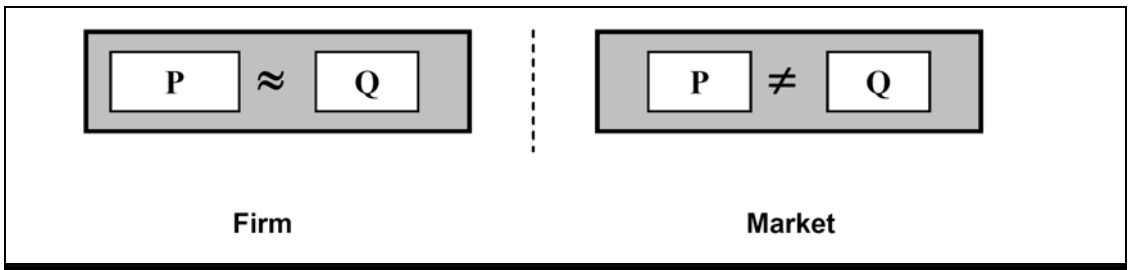

Figure 1. Firm Organization as a Coordinated Mechanism

The basic input under either firm or market organization (see Figure 1) includes economic actors or the agents P and Q. P and Q can be thought of as either agents in a "firm" or as self-directed actors representing two distinct firms (market). Under firm organization, P and Q are related in some "common communicative environment" (Schutz, 1976 p.31). Put differently, a firm is a situational environment shared by a group of agents (or P and Q) such that they are able to communicate with one another (Yu, 1999). Within the Austrian school of economics, Foss (1993) endorses this view of firm organization. Treating a firm as an entity where P and Q support "shared mental constructs" (P ≈ Q), he notes that an important rationale of a firm is that it makes sense out of the world for a subset of the economy's input-owners by cultivating a shared knowledge base.

Under firm organization, a coherent world of knowledge and a cultural community dominates. Coordinating resources in a common environment, a firm thus represents groups that are bounded by a collective understanding about their community (Brown and Duguid, 1991); a shared repertoire of language or routines (Nelson and Winter, 1982; Wenger, 1998); loyalty to a defined purpose (Masten, 1988); mutual understanding and consent among members (Schutz, 1976; Whitley, 1984; Yeoh and Roth, 1999); existence of a micro-cultural community; or an in-group (firm) formed out of an out-group (market).

A principal point is Contracts do not have to necessarily entail employer-employee (Simon, 1957), authority-based (Coase, 1937), or even knowledge substitution based (Conner and Prahalad, 1996) relationships to classify as a "firm". Firm organization can also be defined as communities of practice where members (agents) cultivate a shared knowledge base. This neither precludes a firm from being an input-output production function, nor from including alternative perspectives on firm organization.

Having outlined an alternative concept of firm organization, we suggest that disciplines can be seen as purposively adaptive firms. Disciplines do not explicitly entail authority or knowledge substitution relationships. However, what they do entail are agents who have some "shared mental concepts" and who seek to address some market need. Agents (P and Q) representing a firm are, thus, homogeneous – in the resource-based sense – in the nature of their existence, and, hence, that of the firm. In the event that P and Q are heterogeneous with respect to the boundary conditions (or they do not share the same mental concepts ($P \neq Q$)); P and Q actually represent two distinct firms. In Figure 1, P and Q—if heterogeneous— can be thought of as exerting an outward force on the boundaries of a firm: either disintegrating into a market or merging its boundaries with another firm. Therefore, as a coordinating mechanism, for firm organization to be feasible (on the net), greater homogeneity is required within firms and lesser homogeneity is required between firms.

2.3. Market Dynamics

A second subset of characteristics that allows use of a *synechdochic metaphor* includes: i) the nature of resource acquisition (or resource allocation principles) for knowledge firms' vis-à-vis contemporary firms, and ii) the emergence of competitive forces. We diagram our specific conceptualization of inter-firm competition in Figure 2:

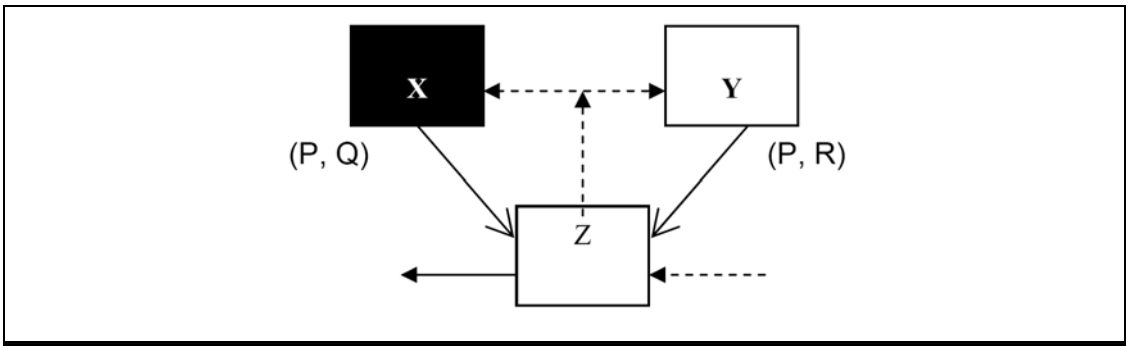

Figure 2. Competition between Firms as synonymous with Disciplines

Consider, as an example, one way in which competition unfolds between two firms X and *Y* for acquiring resources from a buyer Z. The bold arrows represent product flow, while the dotted arrows represent resource flow. Though a single buyer or market, Z, exists, *X* and *Y* nonetheless supply products in two markets. Specifically, one component is the common product (P) supplied by both *X and Y* to fulfill the needs of Z. This common product, or the homogeneous product, is where competition exists between *X and Y.* Since Z represents a utility maximizing agent, Z prefers to procure P from the supplier that it believes offers the best value. Concomitantly, both *X and Y* also operate in a second market Z. Here, this other component in Figure 2 represents the heterogeneous products (R,Q). Competition does not exist at this point, since only a single supplier serves Z for each

product. As to the issue of sustainability, *X and Y* will try to drive each other from the market, since all parties are utility maximizing, and, thus, Z will only support either *X or Y* as far as the production of P is concerned. *X or Y* will end up maximizing its utility by attempting to offer product P, since this is the component that can be offered (imitated or substituted) at the lowest cost. Put differently, a hostile takeover by either *X or Y* will tend to increase revenues for one firm at the expense of the other. To the extent that the unique component remains difficult to produce for the other party, both firms will tend to sustain ceteris paribus.

As per our first aspect above, competition of the sort observed between two firms is also applicable to that between knowledge firms Y (IS) and X (non-IS disciplines). The basic structure necessary for competitive maneuvers between IS and other disciplines is similar to that between contemporary firms. Knowledge firms exist to address some need faced by buyer(s) Z (such as institutions).[1] In return for fulfilling its needs, Z supports and provides resources to IS and other disciplines. As in the case of contemporary firms, Y and X offer product portfolios or fulfill needs that are heterogeneous in some aspects and homogeneous in other aspects. For example, X may not compete with Y across products involving system analysis and design, and Y may not compete with X across products concerning cannibalization strategies, because these knowledge products are heterogeneous. Homogeneous products, however, can be more easily produced by both X and Y. As an example research on control in IS mimics research on control in management. Context aside, control can be seen as a common product offered by both X and Y and, thus, offers potential for competition between Y and X.

In prior discourse on the IS field, competition for resources as a core concept has been rarely referred to, leading some to conclude that heterogeneity (and the resource-based view) is inconsequential in sustainability analysis of knowledge firms. Without the common element P, competitive forces may largely have been seen as absent. Alternately, the primary aim for formation of knowledge firms may not have been seen as resource oriented (i.e., knowledge firms do not display resource-seeking behaviors), making resource-seeking assumptions seem questionable. As we show however, while resource-seeking behavior results in competitive forces under product commonality between Y and X, relaxing this assumption does not rule out competition, as long as markets do not embrace redundancies and the resulting inefficiencies. Therefore, in contrast to some opinions, we believe that in the specific case of Y and X, competitive market forces have come into effect. One reason is the largely inter-disciplinary nature of products offered by Y, which are aligned closely to those offered by X. X, therefore, may view such offerings as synonymous to its own products. Stated differently, products offered by Y may actually be perceived as "natural extensions" of X's products – causing X to engage in hostile takeovers and, in the process, creating competitive forces.[2] Alternately, if the value of products offered by Y tends to have a central impact on offerings by X, then it is obvious that X cannot sustain itself by discounting the role of Y's offerings (Achrol and Kotler, 1999). Thus, to the extent that Y's products align with or adversely influence offerings by X, X will attempt to appropriate (honest or otherwise) and serve its needs that are fulfilled by Y. If we now extend this same rationale to include multiple X's such that each additional X in the domain attempts to appropriate a part of the products offered by Y, it is straightforward to see that each supplier grows at the expense of Y and creates competitive forces in the process. Under this simulation – assuming a virtually and universally relevant offering by Y— in Figure 2, Y offers a small unique subset of products and a majority subset of products P aligned with at least one X. If Z's utility of Y's unique product is low, homogeneity in Y's products can exert an outward force on Y, decrease the overall utility of Y to a utility maximizing Z, and cause eventual disintegration of the knowledge firm, since an individual or collective X can provide virtually the same products offered by Y.[3]

[1] By institution and buyer Z, we imply an academic institution, typically the case in our knowledge markets.
[2] We are grateful to an anonymous reviewer for pointing out that competition could also result from Y overstepping the territory of X instead of X actively seeking to eliminate Y.
[3] Note that if Y and X were perfectly homogeneous there is no ex-ante reason to believe why Y should be replaced or taken over by X. However, since X is more established than Y and Y's offerings are a derivative of what X offers, it is more likely that Y will be disintegrated.

Table 1. Similarities between the Nature of Contemporary Markets/Knowledge Markets. And How Contemporary and Knowledge Firms Compete as Suggested in the Literature on Identity Crisis

Resource Concepts	Identity Concepts	Sample References
DOMAIN-LEVEL SIMILARITIES: SHOWS BASIC BUILDING BLOCKS FOR COMPETITION ARE SIMILAR IN BOTH CASES		
Firm	Discipline as an organization	(Benbasat and Zmud, 2003; Nambisan, 2003; Whetten, 1989)
Products	Models and theories	(Nambisan, 2003)
Strategic factor market and Resource advantage	IS products and markets of internal and external customers, customer needs and demands	(Alter, 2003; Benbasat and Zmud, 2003; Lyytinen and King, 2004; Watson et al., 1999)
Competitive advantage	Performance of field, long term survival of discipline, sustainability of IS discipline, competitors	(Alter, 2003; DeSanctis, 2003; Whinston and Geng, 2004)
RESOURCE-LEVEL SIMILARITIES: SHOWS KNOWLEDGE PRODUCTS CAN SHARE THE SAME ATTRIBUTES AS CONVENTIONAL PRODUCTS		
Valuable Products	Valuable research, contribution to external stakeholders, deliver value in research work,	(Alter, 2003; Hirschheim and Klein, 2003; Power, 2003)
Firm heterogeneity	Heterogeneous groups for long term survival, delineation of IS boundaries, diversity of topics, differentiation	(Alter, 2003; Hirschheim and Klein, 2003; Ivari et al., 2000; Myers, 2003; Power, 2003)
Non-Imitable	Organizing principles, IT artifact, exemplary theories, errors of inclusion and exclusion, prevent imitation of work, replaceable and tradable nature of IS research, barriers to entry.	(Alter, 2003; Guthrie, 2003; Hirschheim and Klein, 2003; Ivari et al., 2000; Myers, 2003; Orlikowski and Iacono, 2001; Power, 2003)
Resource Immobility	Migration of skills to other fields	(Hirschheim and Klein, 2003)
Market related capabilities, Marketing capabilities	Creativity in IS products, visibility, salience in IS research, Aaddressing research questions of current interest	(Benbasat and Zmud, 2003; DeSanctis, 2003; Hirschheim and Klein, 2003; Ives et al., 1980)
PROCESS-LEVEL SIMILARITIES: SHOWS THAT KNOWLEDGE PRODUCTS ARE DEVELOPED and DISTRIBUTED IN SIMILAR WAYS		
Path Dependence	Cumulative knowledge generation, long term development of outcomes	(Benbasat and Zmud, 2003; El Sawy, 2003; Lee, 1991)
Capabilities, Routines Resource, Complements, Integrative Integration	Capabilities, selection of theories and methods, adaptation, plasticity in IS work, integrate resources, connection (Integration of IT tools), immersion, and fusion (IT and human persona bundled together), greater communication, communication disconnects, reference disciplines	(Benbasat and Zmud, 2003; El Sawy, 2003; Guthrie, 2003;,Hirschheim and Klein, 2003; Keen, 1980; Keen, 1991; Weber, 2003; Wu and Saunders, 2003)

We have established that honesty or opportunistic resource-seeking behavior on the part of any knowledge firm does not rule out competitive forces of the sort observed in markets. Rather, this exists only if we assume that markets (and by implication Z) knowingly embrace inefficiencies. We conclude that competition and resource acquisition between knowledge firms Y and X parallel those of contemporary firms, so resource theories of competitive performance of the firm can be useful in addressing sustainability of knowledge firms.

Beyond establishing that knowledge firms have some parallels with contemporary firms and that knowledge markets and knowledge buyers operate in more or less similar fashion as their counterparts in traditional markets, it is important to note that use of a resource-based perspective is also *implicitly* justified in the extant literature on the IS field and its identity. As elaborated in Table 1, similarities exist at various levels between contemporary firms and knowledge firms. Domain level similarities equate the competitive domain for knowledge firms to that of contemporary firms. For instance, models and theories offered by knowledge firm Y are instruments to address the needs of Z. Thus, models and theories exist to address some need that corresponds to products and services offered by firms. Resource and process level similarities address the determinants of performance differences between firms in the competitive domain. As seen from Table 1, resource-based attributes display striking similarities to concepts and concerns outlined in the literature on identity (and sustainability) of the IS field. Factors outlined in this literature as desirable are some of the very same factors posited by RBV for the acquisition of economic resources.

3. Resource-based Metaphorical Model For IS Research

We begin by outlining a stylized process of resource acquisition in knowledge markets. It is an elaboration of the broader concept of market dynamics outlined earlier. However, here we focus on knowledge markets, and the point of competition in such markets: i.e., the common product P offered by Y and X. Specifically, our intention is to point out the sources of revenue generation (i.e., the market), and the motivation of these sources to support the knowledge firm. Clarifying these issues provides a logical basis for addressing our primary question of what factors predict resource acquisition in knowledge markets and, hence, sustainability of knowledge firms.

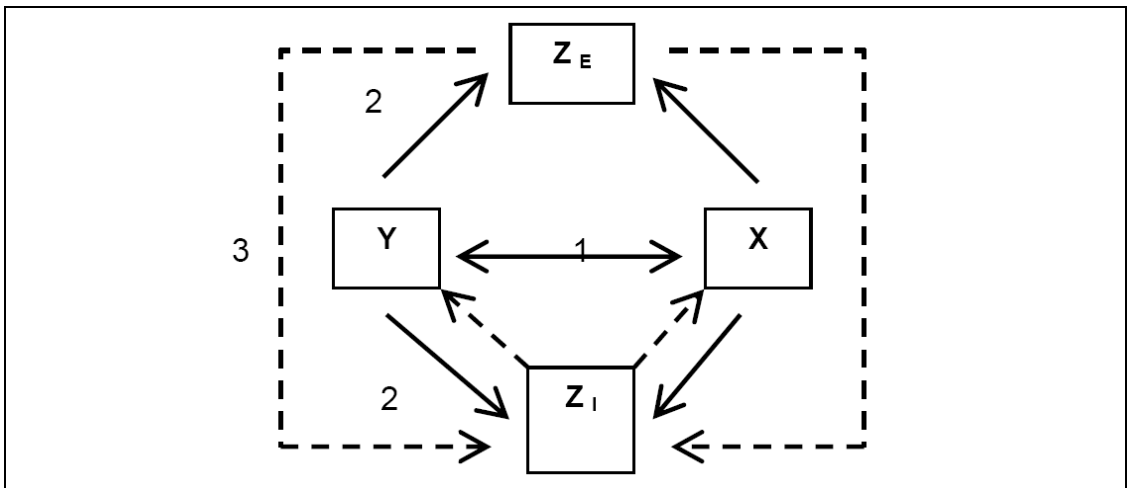

Figure 3. Process of Resource Acquisition

As earlier, bold lines represent product flows, while dotted lines represent resource flows. Figure 3 displays two knowledge firms (Y, X) each offering a set of common products, P. Each firm could independently develop the products (e.g., Resource-based Theory), or the products could result from integration and transfer of knowledge (arrow 1) between firms (as experienced by Agency Theory or Technology Acceptance Model, in economics and psychology, respectively). Both firms provide knowledge products (2) in two markets: the primary market Z_I (internal customer or institution), and a

secondary market Z_E (external customer or practice). In knowledge markets, Z_I is the primary revenue source for any knowledge firm. In the sustainability literature, the role of Z_E is clearly acknowledged, but with the concept of competition among knowledge firms absent, Z_I is not usually considered as a form of market (or customer for the discipline). Both Z_I and Z_E are dependent to some extent on the knowledge products provided. Consequently, under a quid pro quo system, the market exchanges resources with Y and X in return for their products, although the priorities of Z_I and Z_E differ in terms of what is desired in the product — see (3). Specifically, Z_I provides the primary revenues for both knowledge firms, and given that it is utility maximizing, it sets up the constraint that the products provided by Y and X are different from each other. Absent this constraint, Z_I ends up supporting two firms that provide identical products. As noted earlier, there is no ex-ante reason to believe that the market will want to sustain redundancy, and thus, Z_I will likely divert resources from one firm to another. However, Z_E does not directly support the knowledge firms, and hence any difference between Y and X is inconsequential to Z_E. In direct contrast to Z_I, which only indirectly benefits from supporting knowledge firms, Z_E benefits directly through actual use of the products offered (e.g., Porter's five force framework is a key strategic tool used by firms worldwide: For instance, K-Mart specifically provides funds for marketing positions in institutions in return for knowledge products). Therefore Z_E desires products that can be directly applied toward realizing its own objectives. Given the two markets and utility maximizing behavior, Z_I decides to allocate resources to Y or X based on the indirect revenues they can generate for Z_I, while Z_E allocates revenues (either directly to Y and X, or indirectly by providing revenues to Z_I) based on how well Y and X are expected to contribute to revenue generation for Z_E. This process from knowledge generation (1), to revenue generation (3) for Y and X provides a natural basis for addressing our question of interest on how to secure resources from Z_I and Z_E. The question is tantamount to asking what factors predict the sustainability of Y in the presence of X, and, thus, naturally lends itself to analysis from a resource-based perspective.[4]

A central proposition in the RBV is that tangible product attributes such as heterogeneity or non-imitability, and intangible or interpretational resources such as reputation contribute to performance differences among competing firms (Barney, 1991; Peteraf, 1993; Amit and Schoemaker, 1993). Complementing this idea, organizational theorists suggest that these tangible and intangible attributes determine the ability of firms to garner resources from the market, and thereby influence the survival prospects of the firm (Hannan and Freeman, 1989).

For simplicity, we express tangible resource concepts as heterogeneity and positioning of the products offered. Tangible attributes manifest at two levels: at the level of the product itself (heterogeneity in theory, constructs, etc.) and in product positioning, which relates to how useful the research product is for Z_E (positioning). Similarly, we express intangible attributes as the reputations of the products of Y and X. To keep the analysis consistent, we include only these parameters in the analysis.[5] Referring to our preceding discussion of resource acquisition, *heterogeneity confers upon Y the ability to extract rents from Z_I, while positioning confers the ability to extract rents from Z_E.* Heterogeneity only captures the present value of the knowledge firm, and only imprecisely so. However, Z_I does not base its evaluation of Y solely on the present value, since this will tend to discount the potential for future returns to support Y. Concomitantly, Z_E does not base its evaluation solely on positioning either. Inherent uncertainty associated with knowledge products makes it impractical for Z_E to make an ex-ante evaluation of the value of products offered. Consequently, both markets tend to value Y or X based on a third, intangible aspect of firm value — namely reputation of Y and X — in choosing to allocate resources. On the whole, we maintain that tangible and intangible

[4] It is important to note that Z_I does not include other disciplines such as management or economics (in our model these are competitors, not buyers or customers).

[5] Suggesting that heterogeneity is used is not to say that the concept of imitability in RBV is ignored. These concepts are related. Products that are heterogeneous are also expected to be non-imitable as compared to products that are less heterogeneous. However consciously stay away from the notion of substitutability of products since as suggested subsequently, whether two knowledge products are substitutable is difficult to determine ex-ante. Markets therefore are much more likely to (and indeed do) rely on heterogeneity across intangible product attributes such as reputation to determine their value. Finally, as is standard in RBV analysis, we expect that properties of the firm (e.g., value) are reflected in the products (i.e., product value) —see Wernerfelt (1984) for additional discussion on this point.

attributes interact to influence the utility of Y to Z_I and thus the heterogeneity of resources between Y and X.

3.1. Tangible Attributes

Heterogeneity: Following the arguments by Benbasat and Zmud (2003, p.186), heterogeneity can be taken to imply distinctness between two knowledge firms at both the level of topics studied (phenomena), and at a more theoretical level in the instruments (such as constructs, relationships, etc.) used to study the different phenomena. Thus, Benbasat and Zmud propose that the IS firm is distinct from other knowledge firms, provided it studies phenomena related to the IT artifact such as design; construction and implementation of IT artifacts; human behavior associated with the use of IT artifacts; the impact of these artifacts on human behaviors; structures and contexts in which they are utilized; and the associated collectives such as organizations and groups.

We partially subscribe to the view of Benbasat and Zmud (2003), but for the purpose of this study, our intent is to define heterogeneity at a more basic, theoretical level as differentiation between Y and X due to the inclusion of IT concepts and IT context specific relationships in studying generic phenomena in Y's research product portfolio. This definition is neither holistic nor does it imply that studying generic constructs and relationships (such as perceived usefulness/perceived ease of use, and its relationship to intent to use) should be a "forbidden" practice in IS research (see Agarwal and Lucas, 2005). Instead, our intent in defining heterogeneity at the theoretical level reflects our view that competition between Y and X occurs only in the case of the common products offered by both.

Consider as an example a study examining the impact of human characteristics on firm performance. Firm performance as a generic phenomena is a topic studied by both Y (IS firm) and X (e.g. Strategy). Y and X could implement the same hypothetical model shown in Figure 4a, or Y could differentiate itself from X by studying the model shown in Figure 4b.

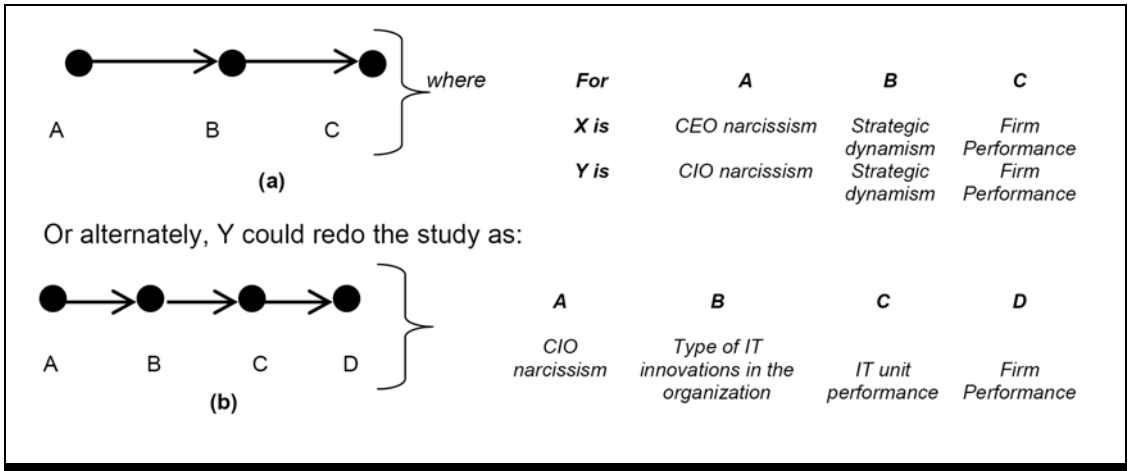

Figure 3. Concept of Heterogeneity

Differences in the studies illustrated in 4a and in 4b arise from differences both in constructs utilized to study a generic phenomena such as firm performance, and in the theoretical basis used to justify relationships in the model. In Figure 4a, both Y and X follow similar logic that narcissism leads to dynamic investments, which, in turn, causes variance in firm performance. Therefore, both are homogeneous. In other words, X could implement Y's product and Y could implement X's, and make each other redundant. In 4b, however, Y is differentiated from X, since it embeds and adapts the concept within an IT context (i.e., using IT-based concepts), making itself non-redundant to X. Numerous alternate examples can be provided to illustrate this idea, but, in general, extreme cases such as research in control (e.g., Kirsch, 1996; Kirsch, 1997),X and Y engage in virtually identical conceptual research. The "nominal" nature of such product offerings (Orlikowski and Iacono, 2001)

makes the IS firm redundant to X. The nominal nature of products offered by Y makes them prone to imitation and hostile takeovers by X, since X faces virtually no costs in offering Y's research portfolio. If X is more established than Y, and if Y draws upon X's concepts to define its product, then there exists no ex-ante reason why Z_I should support redundant firms and bear inefficiencies arising from them. Y can expect disintegration (or absorption/hostile takeovers) by X. En passant, high heterogeneity in Y's products creates opportunities for appropriating rents and keeps those resources from being competed away. If Y lacks knowledge differentiation criteria compared to its more established counterpart X, its utility for Z is lowered. Since under homogeneity, any rents to Y are essentially lost returns to Z, Y's position can either be expected to disintegrate or be competed away by X.

Positioning: Positioning is concerned with Y's basic shift from creating products with concepts and constructs that are theoretically heterogeneous to those offered by X (and thus prevent imitation by X), toward products that fare better in terms of being a) interesting to practice in IS, b) operationally valid, c) timely, and d) related directly or indirectly to efficiency or effectiveness or both, and performance in general — in short, products that are goal relevant compared to those offered by X. Operational validity for instance concerns the ability of executives to manipulate and measure the concepts included in research models/products.

Positioning manifests at two levels: namely, in the attributes of the products (product level), and at the level of the firm (such as firm visibility). Though the concept of positioning has been well addressed by the work of Thomas and Tymon (1982), we will briefly discuss it with an example. Consider the prominent research stream on the Technology Acceptance Model (TAM) in IS research. The model predicts that perceived usefulness and perceived ease of use lead to intent to use an IT product. This model is accurate, yet it falls short on the positioning criteria (see Benbasat and Barki, 2007). First, the model has been deemed obvious, considering the kind of non-networked, individually used products (such as MS Word) for which intent is predicted. Second, the model is not operationally valid, since perceived usefulness and perceived ease of use are, by themselves, not operationally valid or actionable (Venkatesh et al., 2003; Benbasat and Barki, 2007). Finally, the model does not capture use in a context in which IS executives are likely to be interested, instead focusing on use of individual technologies (see Venkatesh et Al., 2003). These arguments suggest that if offered to practice, in all likelihood TAM in *its basic form* would be rejected by Z_E.

Alternatively, consider one of the recent studies by Rai et Al. (2006) on the impact of digitally enabled supply chains on firm performance. In comparison to TAM, not only is their model heterogeneous with respect to research in other disciplines, but it is also positioned appropriately in terms of the four positioning attributes outlined. First, their model is timely in that organizations are increasingly forming partnerships, competing on a supply chain-wide basis, and initiating supply chain-wide activities to gain advantageous positions in the market (Sahin and Robinson, 2002). Second, the performance variable (firm performance) and context are both interesting and relevant to IS and non-IS executives. Finally, the variables included in their model are ones that can be easily measured and manipulated in practice (such as data consistency and cross-functional application integration).

In closing, we observe that positioning moves products from the generation/codification stages, to the transfer/realization stage so that Y's product value is visible and favorably perceived in practice (Grover and Davenport, 2001). While the focus of heterogeneity is to differentiate and gain resources from Z_I , the focus of positioning is to improve the utility of the product in practice and to gain resources from Z_E. Indeed, as Rindova and Fombrun (1999) note, positioning permits knowledge firms to provide more and easily comprehensible product information to Z_E and/or create perceptions about the utility of Y for Z_E.

3.2. Intangible Attributes: Resource Allocation Behavior of Z under Ex-Ante Information Uncertainty

Heterogeneity and positioning create opportunities for Y to outperform X. Yet creating the opportunity doesn't necessarily translate into Y actually achieving sustainability by acquiring resources from Z_I or

Z_E. An important question to consider is what prevents Y from being sustainable in the presence of other disciplines. One answer is that resource allocation behaviors by Z occur under bounded rationality. Limited cognitive abilities on the part of Z prevent it from objectively determining if its needs are, indeed, met or if the products offered by X and Y are capable of fulfilling them. Thus, even when products are well differentiated and positioned, sustainability may not result, if Z's perceptions about Y's products vis-à-vis X's remain to the contrary. Of course the exactly opposite case remains a possibility.

In their treatise on the transactional perspectives of knowledge, Grover and Davenport (2001, p.16) point out a fundamental aspect of knowledge products vis-à-vis non-knowledge ones. As they note:

> The unique nature of knowledge makes it very difficult to compare knowledge sources (and hence the products). If consultant A is prescribing methodology 1 to solve a problem, and consultant B is prescribing methodology 2, how should a company make a choice, given that problem X is unique to the context of the company, and methodology 1 and 2 have never been tested within that context.

A central implication is that compared to non-knowledge products, knowledge products are characterized by ex-ante uncertainty as to the outcomes of using such products. Limits to cognitive processing on the part of Z_E prohibit a complete assessment of the utility and the impactedness of using Y's products. Determining whether X or Y offers the better value proposition is a complex task carried out under incomplete information. As a corollary, *ceteris paribus* (i.e., assuming a fit between Z's wants and Y's or X's offerings) perceptual—non-objective—intangible attributes of a knowledge firm, such as reputations, play a central role in Z_E's assessment as to whether Y or X provides the more superior and valuable product. In an influential study on firm reputations, Rindova and Fombrun (1999) have acknowledged the critical role of intangible attributes. Because ex-post discovery may be costly, their argument suggests that intangible attributes serve as proxies for product or firm value, and as safeguards against loss of Z_E's investment; thus impacting the probability of Y acquiring resources in a homogeneous market. The use of reputations as a signal of the utility of the knowledge firm (and hence the knowledge product) is identical for both Z_E and Z_I.

The dynamics of the effects of reputations on market competition and the likelihood of Y outperforming X are straightforward. Specifically, Y and X strategically compete against each other on three attributes noted so far: heterogeneity, positioning, and reputation. Each of the three attributes raises the utility of Y for Z_I. Heterogeneity provides Y with the ability to gain resources from Z_I and protect itself from hostile takeovers by X. Positioning, on the other hand, provides Y with the ability to gain resources from Z_E. Finally, reputations serve the role of not only signaling the utility of Y to Z_I and Z_E , but also guards against resource-seeking behaviors from X in the event of low heterogeneity

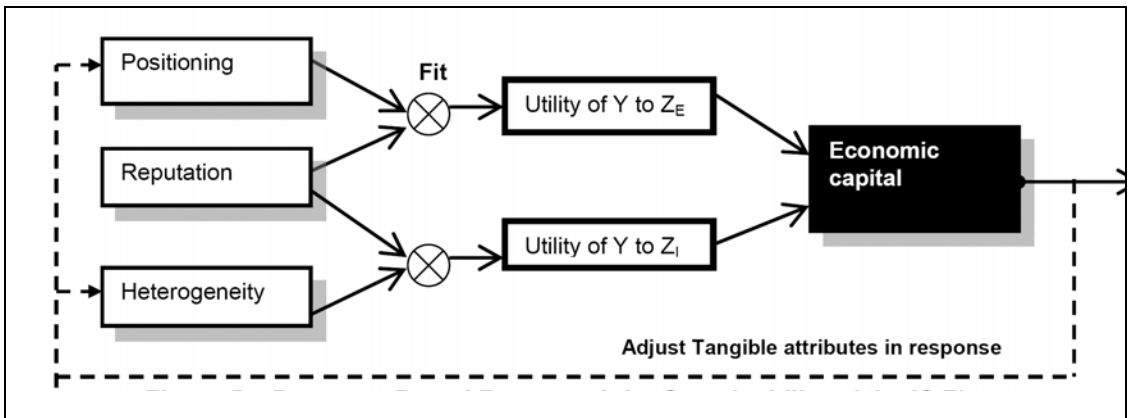

Figure 5. Resource-based Framework for Sustainability of the IS Firm

Note: *Not all relationships displayed in the model*

between Y and X. Collectively these three attributes of the product raise its utility for Z_I and, thus, result in generation of economic capital — revenues and rents, and sustainability for Y. Y periodically observes the resources acquired and takes actions to positively influence its utility for Z_I. As pointed out in multiple studies (Hill, 1990; Rindova et al., 2004; Rindova and Fombrun, 1999), one approach to improving reputational resources is through projection and reflection of images, such as the establishment of bodies such as AIS and dedicated conferences. Intangible resources act as market valuation signals that influence the structure and the conduct of Z_E and Z_I (Hunt and Morgan, 1995). Because one component of a utility-maximizing agent Z is minimization of risk, knowledge firms with greater intangible resources may outperform other knowledge firms despite equality across both heterogeneity and positioning. The overall resource-based framework on sustainability of Y is displayed in Figure 5:

3. Resource-based Predictions on Sustainability of Knowledge Firms

This section presents two aspects pertaining to predictions on sustainability of knowledge firms. First, based on resource logic, we predict the sustainability of Y vis-à-vis X. Second, we introduce one instance of "substitution effects" predicting sustainability of knowledge firms. Substitution effects "substitute" for lack of tangible and intangible attributes or act as surrogates to enhance the utility of Y to Z. In predicting the outcomes, we do not claim that our predictions are anything but probabilities, since a complete assessment of product value offered by Y or X remains in part exogenous to our analysis, i.e., on Z's side — and thus indeterminate. However, we present this analysis in order to provide a fresh way to frame this important discourse.

Figure 6 illustrates the probability of Y outperforming X given knowledge of three attributes in the resource framework under the **"constrained case"**: i.e., where reputational resources arise as a result of being heterogeneous and well positioned. Each factor is dichotomized as high or low, indicating whether Y is superior or inferior on that attribute.

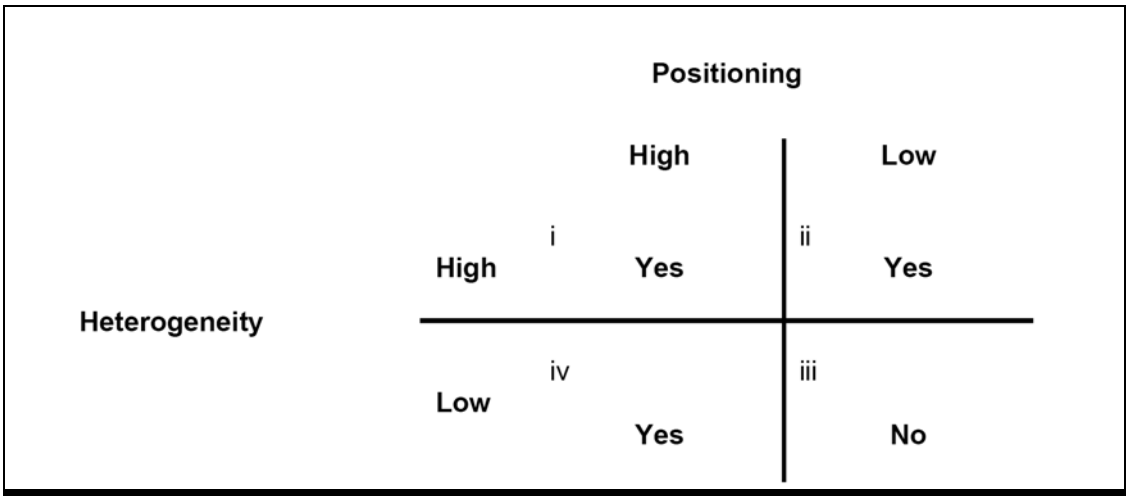

Figure 6. Predictions on sustainability of IS firm (Constrained Case)

In cell (i) high values on heterogeneity and positioning result in high reputations for Y. As all three product attributes are high, Y is in a position to seek resources from both Z_I and Z_E. Y therefore will sustain in (i). In (iii) where both heterogeneity and positioning are low, the forecast is exactly opposite of (i), and there is a minimal chance to sustain in this quadrant. Coming to (ii), where positioning is low but heterogeneity is high, Y is able to sustain due to revenues generated from Z_I. As noted earlier, since Z_I uses knowledge products only on an indirect basis, the only criteria specified in this market is avoidance of redundancy. If heterogeneity is high, a boundedly rational X cannot attempt a hostile takeover in spite of being utility-maximizing. Finally, in (iv), sustainability remains a feasibility as well,

as positioning is high but heterogeneity is low. Therefore, Y enjoys a higher reputation with Z_E as opposed to Z_I. In return for products offered by Y, Z_E provides Y with resources. In this case, while Y might be clearly redundant with X, and hence undesirable for Z_I, disintegration of Y does not result because the utility of Y remains high to Z_I (due to its ability to seek resources from Z_E). Y, therefore, can be thought of as self sustaining or as a resource source for Z_I. Of course, an obvious question is "why can't X attempt a hostile takeover of Y?" An answer is that due to inherent uncertainty in knowledge products, an important attribute in Z_E's choice of whom to transact with is, in part, decided by the intangible attribute firm reputation. Higher product utility helps Y gain cognitive–reputational resources that create time compression diseconomies (i.e. imitation barriers) for X. Thus, while X may be able to imitate and offer Y's research products, it is incapable of replicating its intangible product attributes.[6]

Analysis in "free case": The case in which reputation effects are assumed to be independent is analogous to the "constrained case," except that it opens up the possibility of Y failing to sustain in any quadrant in Figure 6. This result arises from inclusion of low and high levels of reputation effects in each cell in Figure 6. When reputation of Y is high, utility of Y to Z (whether Z_I or Z_E) is high, and this information gets used in allocation of resources. Alternately, when reputation of Y is low, the utility from having to support Y presents a more risk-induced proposition for Z (i.e., knowledge credibility). If one component of a utility-maximizing Z is minimization of risk in its investments, then Z will not choose to support Y despite superior positioning and heterogeneity of its products.

Figure 6 suggests that Y will be unable to sustain in the face of low heterogeneity and positioning. In addressing the conundrum on why some knowledge firms nonetheless manage to sustain despite being in this quadrant, we argue that it is the "independent" attribute of reputation that promotes sustainability in this cell. More precisely, below we analyze one specific source from where reputations might be gained, provided some degree of positioning and heterogeneity exists. We call this effect the substitution effect because it allows Y to gain resources from Z_I despite being homogeneous to X, and low on positioning and reputation. In other words, the substitution effect "substitutes" and "fills in" for the missing attributes necessary for sustainability.

4.1. Auxiliary Analysis: Substitution Effects

It is not possible to address in detail questions pertaining to why or how some knowledge firms survive under scenarios of low heterogeneity and low positioning of research products. The key to unlocking this paradoxical outcome lies in the concept of substitution effects. We provide an approach through which substitution favorably impacts sustainability under adverse differentiation and positioning effects.

Simply stated, if a certain level of heterogeneity is assumed ex-ante, substitution effects favorably

[6] Note that the nature of research products utilized in (iv) will be more applied so that they are beneficial to practice (or Z_E). A profit-making firm will tend to sponsor research products (provide resources) if it finds this useful in enhancing its own value. We supply two specific examples, but they are numerous. The first is the Center for Information Systems Research (CISR) at *Massachusetts Institute of Technology* (MIT). MIT, the institutional buyer Z_I supports CISR due to its ability to seek funding from practice (Z_E). As they note: The Center for Information Systems Research (CISR) conducts field-based research on issues related to the management and use of information technology (IT) in complex organizations… our mission is to develop concepts and frameworks to help executives address the IT-related challenges of leading increasingly dynamic, global, and information-intensive organizations. The relevance of our research is ensured by the active participation of corporate sponsors from a range of industries (http://mitsloan.mit.edu/cisr/about.php)... The information systems research center at the *University of Houston* serves a similar purpose. Products will align with those offered by consulting firms such as *Mckinsey and Company*, *Bain and Company*, and *Boston Consulting Group* among others. Also consider direct sponsorship of faculty positions, where Z_E sponsors and provides resources to Z_I for offering products that meet its needs. Pfeffer (2007) outlines how K-Mart, a major retailer, funds faculty positions at Wayne State University (the K-Mart Chair in Marketing). In return for research beneficial to K-Mart, K-mart offers resources to Wayne State (Z_I). Note that regardless of how homogeneous Y is with respect to X, Z_i now has no motivation to disintegrate Y, which underlies why Y tends to sustain in cell (iv). See also recent discussions in the *Academy of Management Journal* (2007) for more on this point.

impact sustainability by raising expectations about the utility of Y or X to Z. Thus, substitution effects are phenomena (whether internal or external) that create positive reputation states for Y or X about *future* expected returns, as opposed to present ones. If such future expectations are created (reputations are augmented), then we approach a free case for Y or X where reputations are independent of current values of heterogeneity and positioning. High reputations substitute for lack of positioning and differentiation, leading to sustainability in cell (iii). The approach elaborated and diagrammed in Figure 7 displays one such phenomenon of Schumpeterian shocks in a knowledge firms' operating environment, and its association with reputation effects and resource allocation by Z.

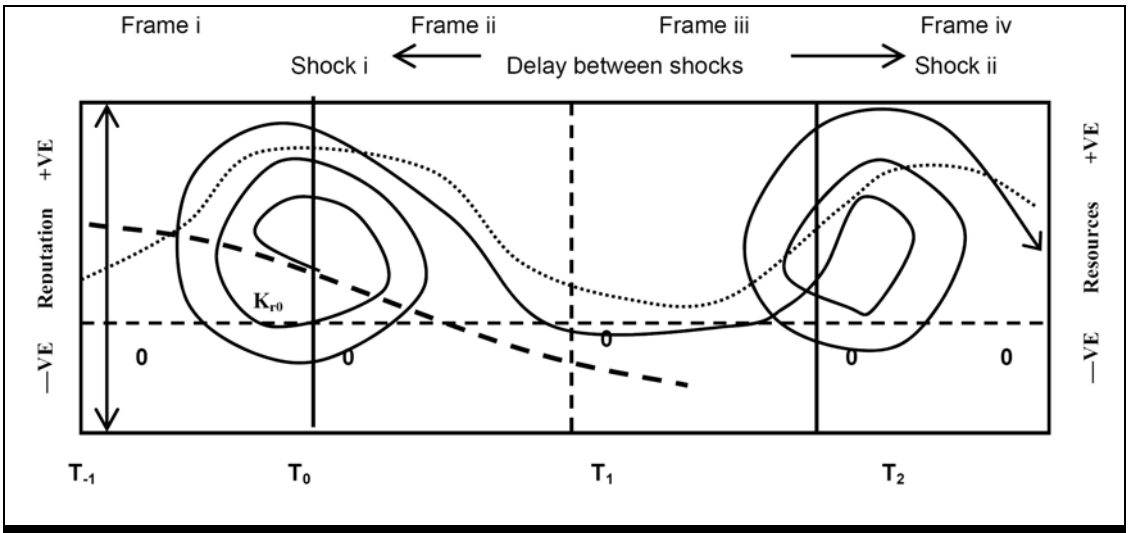

Figure 7. Schumpeterian Shocks as substitution effects

The basic input to the analysis is a heterogeneous Y with an initial positive (or negative) reputation state given by K_{r0} (at t=0). Under the event that no exogenous forces (shocks) are experienced, Y eventually shifts to the "constrained case," where reputation effects are partly determined through heterogeneity and positioning attributes. Since both heterogeneity and positioning are low in cell (iii), reputation effects also take on a negative value, leading to disintegration of Y in the market (see bold dotted line). Alternately, however, if a shock (or a demand surge) is experienced at $T_{0,}$ then Y's utility as to future returns to Z will raise Y's reputation (see smooth bold line and left axis). When reputations are high, our model asserts that Y will be able to acquire rents from $Z._i$. in other words, the flow of rents follows the flow of reputations or perceptions about Y for Z_i. Therefore, Y may acquire (see smoothed dotted line and right axis) resources from Z. A resource-seeking X, having post-hoc seen the resources directed to Y, will choose to redirect those resources toward its own ends by laying claim on the demand surge at T_0. If Y lacks heterogeneity (proximal to X), then it is easier for X to argue against Y's utility to Z. If a utility-maximizing Z perceives that X can fulfill the demand surge instead of Y, it will attempt to redirect resources back to X, causing a drop in both reputation and the resources allocated to Y (see frame ii and iii). If a new demand surge appears at T_2 and is associated with Y, then the future utility of Y is augmented for Z, and the cycle repeats. If a demand surge does not appear, then Y can be expected to disintegrate among multiple competing X's (or one X) that lay claim on fulfilling the demand surge at T_2. Assuming that the shock is homogeneous — i.e., pertains to the common component p shared by Y and X—the degree of shock at T_1 and T_2 determines the extent of reputation and resources acquired. Once the demand surge is allocated to Y, higher reputations lead to more prolonged resource acquisitions for Y and vice versa.

The emergence of the Internet and its impact on resources allocated to Y (IS discipline) is an illustration of substitution effects. Lyytinen and King (2004) capture the exogenous shock concept succinctly, noting (p.227):

> The salience of the IS field is still evident, as seen in the rapid buildup of demand for IS professionals as the dot.com boom evolved. It was obvious to organizations that

the future envisioned during that boom required many more highly trained IS professionals. Recruiters went wild, salaries skyrocketed especially in North America, and IS programs rapidly added faculty and courses to meet the demand. The fact that the dot.com boom collapsed demonstrates that salience can be fickle, but the phenomenon of the boom illustrates how powerful a force business can be in legitimating any academic field.

The rise of the Internet (an exogenous shock) led to an increase in the utility of Y as perceived by Z_I. Despite the homogeneous nature of Y (e.g., Wade and Hulland, 2004), funding for research and pedagogy on E-Commerce (i.e., allocation of resources to Y) increased during this period (frame i). The subsequent observation that research in E-commerce was aligned at least as closely to marketing and other disciplines, led to loss of value for the shock (frame ii) and a decrease in the resources for Y in later periods (see frame iii). The Internet is, of course, one instantiation, but this phenomena can be observed in much of management research, for example, in the rise and fall of concepts such as Total Quality Management (TQM), Six Sigma, Business Process Reengineering (BPR), and so forth, which have led to the rise and fall of resources in those related areas.

4. Policy Implications

Many researchers have provided insightful commentaries about the crisis in the IS discipline, but little consensus exists about its path to sustainability. Overall, these commentaries have led to a (now) stagnant debate that centers around the audience and stakeholders for the IS discipline (the external practitioner or the internal academic) and the boundaries for the IS discipline (inclusive or exclusive). We attempt to make a modest contribution by proposing a rough policy framework that addresses the issues raised in the introductory section. For simplicity, we will make an extra assumption that there is only one buyer (Z_I) that provides resources to both X and Y. This implies that both X and Y are low in terms of positioning and, thus, need to undertake efforts to gain resources from the external buyers. Advocated here is a contingency framework that takes into account two resources available to a knowledge firm: namely, the reputations that X and Y enjoy with Z, and the heterogeneity between X and Y. Asymmetry across these two sets of resources creates four profiles, which might call for different management approaches or coping strategies (Table 2).

PROFILE 1: PRIMACY

This profile is perhaps the least problematic for a discipline. Knowledge products offered are clearly heterogeneous and reputation is high, implying a steady stream of resources from the market. Often labeled the "Queen of the social sciences," economics is an excellent example of this type of discipline, with its significant and unique contributions to knowledge. Consequently, the overall strategy for this type of profile is Indifference. Given the secure status, a discipline can either pursue academics or practitioners as its primary constituents. Similarly, a discipline can either pursue intellectual capital (i.e., build its own theories and provide contributions to knowledge) or economic capital (i.e., focus on using its stock of knowledge to inform practice). Either approach benefits Z_I . Thus, there are no specific coping strategies that are necessary, and any policy chosen may be determined by other factors.

PROFILE 2: SUBMISSIVE

This profile is perhaps the most problematic for a discipline. Here, the knowledge products offered are often homogeneous to work done in other disciplines, and the market may be unsure of the value added by the discipline. This profile has a high potential for conflict and friction that may result in *withdrawal of support by influential constituents whose cooperation is essential for sustaining and forwarding the discipline*. Achieving heterogeneity in such a "hostile" environment may be extremely difficult because of the often prolonged time periods required for knowledge generation. The discipline needs to bolster value by aligning itself with an important constituency. However, there may not be time to achieve substantial adaptation of work in other disciplines or increase value by providing substantive intellectual (long term) contributions. Consequently some form of external coupling with practice is proposed as an overall strategy. The advisable target constituent in this case is the IS practitioner, and it is best to pursue solely economic capital. This approach is a way to "buy time out"

Table 2. Resource-based Implications for Disciplinary Strategy

Reputation \ Heterogeneity	High	Low
High	*PRIMACY* **Overall strategy:** Indifference **Target Constituents:** Disciplines or IS Practitioners **Type of Capital to pursue:** Economic or Intellectual **Implementation Strategy:** None	*ILLUSIONARY* **Overall strategy:** Dual Coupling **Target Constituents:** IS Practitioners **Type of Capital to pursue:** Intellectual and Economic **Implementation Strategy:** Data driven theorizing, action research, identifying potential topics of practitioner interest
Low	*CONCEALED* **Overall strategy:** Internal Coupling **Target Constituents:** Disciplines **Type of Capital to pursue:** Intellectual **Implementation Strategy:** Negotiation, Coalition building, Cross publications, Inter-disciplinary conferences	*SUBMISSIVE* **Overall strategy:** External Coupling **Target Constituents:** IS Practitioner **Type of Capital to pursue:** Economic **Implementation Strategy:** Pro-active, Consultant role, Joint projects with companies, Infrastructure to initiate and manage external needs such as information systems research centers

for the discipline and raise its value in the market. Given questionable value added, the coping strategy advisable here is to forego abstract research with long term implications and instead focus on short term, highly context specific solutions that serve the needs of the practitioner. Since many insightful ideas have been proposed to improve relevance (e.g., Rosemann and Vessey, 2008) it is sufficient to note that the discipline should take a proactive approach to initiating contact and involving itself in practitioner problems that can result in industry funding and raise its value in the market.

PROFILE 3: CONCEALED

In this profile, the discipline adds value, but such value addition may remain concealed, unrecognized by constituents. Here, the work done in the discipline is distinct from others in terms of context, construct, relationships, or theoretical logic applied, but these differences may be subtle. This subtleness can cause perceptions in the market about lack of value and result in a steady decline in resources. This type of profile arises due to a failure to adequately communicate how work in the

discipline is substantial and can potentially add value to other disciplines. It can also arise because the discipline does not pay adequate attention to contexts that have the potential to contribute to other disciplines (see Agarwal and Lucas, 2005, for some research topics of this type). The overall strategy suggested here is "Internal Coupling," meaning to communicate, interact, and explore research contexts where contributions may be deemed useful by other disciplines. If the work is heterogeneous, internal coupling may be more efficient than coupling externally with practitioners. The target constituents best served here are internal (i.e., other disciplines) and, given heterogeneous orientation, pursuit of intellectual capital can be more efficient, provided value added can be communicated to those who matter. Multiple coping strategies may be used here to communicate value such as conducting research that has inter-disciplinary implications (e.g. macro level research topics such as impact of IT at economy level), engaging in cross-publications, and improving internal visibility through inter-disciplinary conferences, among others.

PROFILE 4: ILLUSIONARY

This profile is conducive to change and provides opportunities for innovative thinking. Reputation in the market is high, which provides for a constant flow of resources. This possibility can arise, as we discussed earlier, due to the presence of external shocks (e.g., IT revolutions). However, because heterogeneity is low, other disciplines can stake a claim on knowledge generated within the discipline, and this may eventually result in loss of reputation and resources. Consequently, the overall strategy suggested is "Dual Coupling," implying that research conducted by the discipline is rooted in problems faced by the IS practitioner. This strategy differs from external coupling in that the intention is to produce "generalizable knowledge products." It differs from internal coupling in that the discipline interacts primarily with IS practice rather than other disciplines. The discipline can adopt a general approach, forging ties with IS practice to ensure a flow of resources and buy time that is required for either significant adaptation and rethinking of borrowed theories or abstract observations to create discipline — specific theories, concepts, and body of knowledge. The constituents to be pursued in this case are primarily the IS practitioners, but the objective of interacting with IS practice and pursuing capital is both intellectual and economic. Implementation of this strategy is discussed in some additional detail next.

5.1. A Long Run Approach to Sustainability

Our central interest in this article pertains to what factors determine the sustainability of the IS firm. We now examine how to manipulate these factors. A synopsis of the broader framework — which we term the virtuous cycle of sustainability — provides the basis of our recommendations:

Sustainability is a complex problem, and a fully satisfactory explanation on how to achieve it remains elusive. Therefore, our objective in this article is to provide one approach through which it may be accomplished and one way to think about it. The approach is diagrammed in Figure 8. It reflects our thinking that knowledge is a means to gain access to economic capital. Consistent with the resource-based model outlined earlier, we posit that three attributes— heterogeneity, positioning, and reputation —are necessary to gain access to economic capital. While heterogeneity and positioning are more amenable to direct control, reputation can only be indirectly controlled. Figure 8 illustrates these ideas, where heterogeneity and positioning "influence" reputation, and the three, in turn, influence the economic rents that a knowledge firm can access. To begin, consider a knowledge firm Y in a nascent state or in a relatively early stage of development (as is the IS discipline). The firm has access to some initial stock of economic capital at T_0 but carries zero stock of intellectual capital (i.e., it cannot intellectually claim anything as being its own). The framework posits four processes that lead to acquisition of the resource attributes necessary for sustainability.

Process (1): Gain Access to Source

This process is initiated by using the initial stock of capital available to Y. The firm Y faces two options at this stage. First, it can start borrowing on the intellectual stock of other knowledge firms X, and hope that over time its own intellectual stock of capital builds up. This outcome may or may not result, but, from a resource-based perspective carries the possibility that X will engage in a hostile takeover. X might perceive that Y's products are natural extensions of its own or Z_I might find Y to be redundant

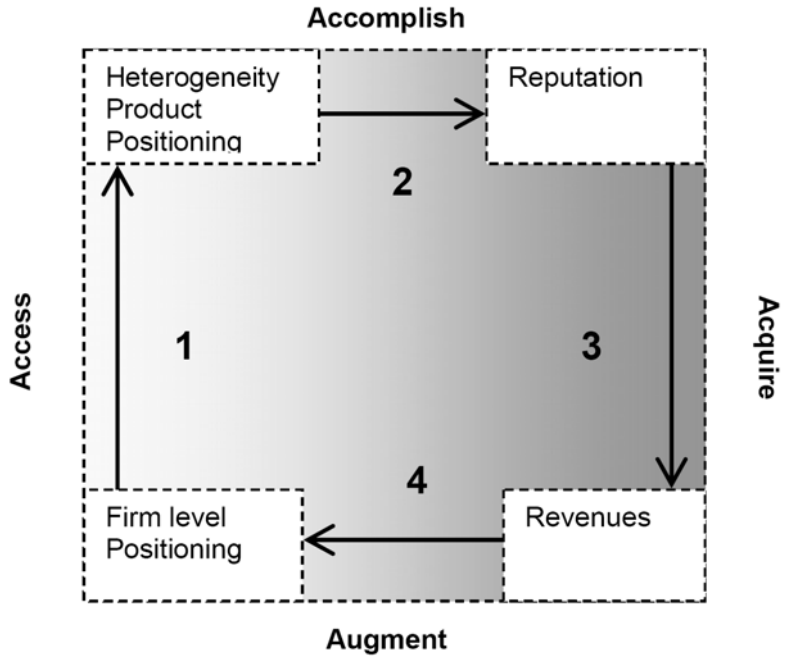

Figure 8. Virtuous Cycle of Sustainability

at some point, and disintegrate it or merge it with X. Second, Y can attempt to build its independent stock of knowledge. Resource-based logic does not advocate the first approach at T_0, but instead maintains that in order for Y to be heterogeneous and well positioned, the initial stock of capital should be spent on increasing visibility through actions such as formation of conferences, practitioner-academic dialogues, and other marketing initiatives that get Y closer to the source (i.e., IS practice) where the phenomena it intends to study actually exist and unfold.

- **Key Implication: Initiate marketing processes to align closely with IS practice**

Process (2): Accomplish Resources through Effective Problem Solving

This process is initiated after Y gains access to the sources where the phenomena it intends to study actually exist and unfold. As in process (1), Y faces two options at this stage: It can start borrowing on the intellectual stock of other knowledge firms X, and attempt to solve problems faced by the source. Alternately, it can through observation and logical analysis, attempt to solve the problem and document it — and over time build its unique stock of knowledge. Resource-based analysis predicts the second approach will result in higher heterogeneity and positioning than the first approach and should be utilized. The first approach — using concepts and theories from other knowledge firms, X, to solve problems — presents two key issues. First, using theories from X inevitably restricts Y's view of the problem and the corresponding solution. Solutions follow from the way one chooses to frame problems, and in the case of knowledge firms, the way problems are framed is largely a function of the underlying theory used. A corollary of Y sourcing knowledge from X, therefore, is that it prevents Y from developing independent knowledge. The consequences of sourcing knowledge from X are straightforward in our resource model: Y becomes homogeneous to X, and, thus, is either susceptible to hostile takeover by X or disintegration by Z_I. Author issue with the first approach is that Y becomes susceptible to bypassing/ignoring problems and phenomena that cannot be explained through the theory, lack theoretical explanation, or simply run counter to the theory. Thus, consequence is that interesting phenomena about which Y may be able to develop intellectual capital may be ignored because they do not fit into the perspective sourced from others. In a critique of knowledge sourcing, Hambrick (2007) points out the negative relationship between use of theories and development of new knowledge:

> A field's theory fetish, for instance, *prevents the reporting of rich detail* about interesting phenomena for which no theory yet exists. And it bans the reporting of facts—no matter how important or competently generated—that lack explanation, but that, once reported, might stimulate the search for an explanation (and study of new phenomena unique to management) (2007, p. 1346, italic added).

The sourcing of knowledge, of course, does not only prevent Y's development of heterogeneous and useful knowledge. In all likelihoods it also carries the potential for developing knowledge that may be interesting but impractical. Sourcing knowledge, and theory in particular, from others implicitly entails subscribing to the concepts endorsed by the particular theory. If these concepts (such as tacit knowledge, absorptive capacity) are hard to measure, it is axiomatic that some impractical surrogates may be used to solve the problem. The consequence of this is straightforward — Y may end up with low positioning at the product level. Assuming that the theory is appropriate and, indeed, provides an admissible solution, Y may end up with a result that is theoretically attractive but deficient in terms of implementation (a recommendation such as to develop tacit knowledge). While theory may improve efficiency in problem solving, it may prohibit and hold back the search for other solutions that may be equally effective and practical in implementation.

While use of theories can improve efficiency in problem solving, they can deter development of heterogeneous, interesting, and practical knowledge. In terms of our model, sourcing of knowledge from X will deter Y's efforts to be heterogeneous and well positioned in the market. If IS as a discipline needs to sustain, it needs to reduce its reliance on using theories from other disciplines, and instead focus on inductive theory building and reporting of interesting facts (as a- theoretical as they maybe) that can induce additional search for explanations and deductive theory-building efforts.

Therefore, our resource model favors the second – objective and analytic-based — approach to solving problems in practice as opposed to one that pre specifies the use of certain perspectives. Problems solved through observation and analytic reasoning provide Y with the possibility of providing solutions that are both well positioned and heterogeneous. As suggested throughout this paper, these attributes will result in securing reputational resources both from Z_E and from Z_I. Reputations, in turn, provide additional imitation barriers that prohibit X from engaging in hostile takeovers.[7]

- **Key Implication: Reduce focus on use of theories from other disciplines and encourage reporting of findings that are interesting rather than solely theory-based**

Process (3): Acquire Economic Capital

The third process in the virtuous cycle of sustainability relates to acquisition of economic capital, rent, or revenues in return for providing knowledge products in markets. This process differs from positions in prior work that emphasize heterogeneity and focus on Emical markets, in that it focuses on establishing a system that values the economics of knowledge generation (see Table 3)

The process of revenue generation itself is straightforward. As noted earlier, when heterogeneity, positioning, and reputation are high, Y can generate revenues from both Z_I (heterogeneity) and Z_E (positioning). Reputational resources, in turn, follow from having these two attributes. Z_I benefits both

[7] Note that this is only one of the many approaches to augment heterogeneity. We predict the likelihood of this approach in generating heterogeneous knowledge to be higher than other approaches such as using theories in other disciplines within IT/IS contexts and adapting them accordingly through analytic reasoning. We supply a specific example: Consider the relationship between Uncertainty and Vertical Integration. *Transaction Cost Economics* (TCE) posits uncertainty leads to vertical integration. Yet if one were to transfer the concept of uncertainty as "uncertainty in technology developments" to the IT/IS context, one would through logical reasoning come up with the conclusion that uncertainty leads to market transactions instead of vertical integration. The relationship between uncertainty and vertical integration in the IS context can thus assume a fundamentally different form and constitute heterogeneous knowledge for IS. It remains true however that this same relationship could be derived by making observations in practice (i.e. aligning with Z_E). More generally, however our focus is on acquiring resources, heterogeneity and positioning are means to our end objective, and how these are achieved remains inconsequential in our analysis.

indirectly from supporting Y, and partially but directly from Z_E (which provides resources to Z_I) in return for Y's work. Since products are heterogeneous, and positioning is high (which results in positive reputational resources that create further imitation barriers), the chance that X will attempt a hostile takeover is low. As indicated in Figure 8 (see final feedback loop), this results in initiation of the final process discussed next.

- **Key Implication: Cultivate a dual focus of acquiring economic capital and engaging in knowledge generation.**

Table 3: Establishing a System for Acquiring Economic Capital

Orientation of Thinking	*Literature (Non-Transactional)*	*Resource-based (Transactional)*
Dominant Resource	Intellectual or cultural	Economic
Knowledge Perspective of Field	Definition of what is studied is defined by rules internal to the field or members internal to the community	Definition of what is studied is based on rules and requirements external to the field
Function of scholars	Focused on enrichment and preservation of intellectual resources. Accomplishments through interactions and borrowing of intellectual capital from other disciplines	Focused on ease of convertibility of intellectual to economic capital. Accomplished through differentiation and internal control through explicit integration of the IT artifact in research
Identity	Generation of Intellectual resources	Business-like, capable of generating economic capital
Role of Knowledge	Collection, generation, preservation, study, interpretation, and free distribution in society	As source of revenue and theoretical development

Process (4): Augment Firm/Product Attributes

In the final process, Y augments its Firm/Product attributes by making additional investments from the revenues generated by process (3). These can then be utilized for increasing firm level positioning (such as additional marketing and foray and expansion of market share) or in development of infrastructural platforms such as databases that allow for distribution of knowledge within the knowledge firm (see Hirschheim and Klein (2003), for instance, who in their analysis of the identity problem suggest formation of knowledge creation and transfer network (KCTN) as one possible means to resolve the crisis in the IS discipline). The initiatives are, of course, numerous, and many are already being implemented, but a key implication is that this process completes the cycle of sustainability and initiates the next cycle of knowledge generation and acquisition of economic capital.

- **Key Implication: Invest in superior firm positioning by improving the visibility of knowledge products offered by establishing information systems research centers, bodies such as Association for Information Systems, and divisions of teaching and research faculty; participating in conferences; collaborating with established consulting firms; engaging in action research; and establishing of practice oriented journals**

Supply and Demand Pathologies

We have provided both short- and long-term policy implications that describe possible ways in which IS can move forward. In offering some concluding remarks regarding the way ahead, it might be useful to re-stress the importance of these frameworks in generating intellectual capital. (the link to economic capital is obvious). Two pathologies exist in the process of knowledge creation that can

hinder for a discipline's intellectual development efforts. The first pathology happens from the knowledge generation side or within the discipline. Here, the knowledge generated is detached or disconnected from the reality that it seeks to explain or the phenomena it seeks to influence. Theories and models are generated without adequate clarification of phenomena as they happen in practice. Ackoff's (1967) work on Management Misinformation Systems provides a classic example of this pathology, as the author points out a number of academic assumptions that do not actually hold in practice. The area of management control systems (see Kirsch, 1996, for instance) similarly often describes images of clean control mechanisms on ISD projects (e.g., payments for following outcomes and behaviors), yet the actual observed control schemes rarely adhere to recommendations.

The second pathology exists on the demand side when we assume that, to a large extent, our theories and models are wrong if they do not conform to what is observed in practice. Here, we tailor our knowledge to the actual phenomena, without giving adequate thought to the notion that either our research may not be understood by practitioners or practitioners may be following "inappropriate ways of doing things." While we do not know which pathology is more dominant, what is clear is that either pathology results in missed opportunities for creation of knowledge and intellectual capital. In the first case, closer interaction with practice can help to ascertain if our theories or models adequately account for actual phenomena. Any discrepancies are theoretical tensions that provide rich opportunities for conceptual development (e.g., predicted control structures from agency theory rarely fit well with actual controls used in ISD projects, which provides opportunities for a theory of control specific to ISD). Pathologies on the practitioner side may also serve as useful grounds for theory building. The widely known Peter Principle is a case in point (Peter and Hull, 1969). The point is, unless and until we involve ourselves actively with practice, we will be unaware of any opportunities that either pathology can provide. There is some anecdotal evidence that provides additional support for these frameworks. Some of the most powerful and widely used theories in management research (e.g., RBV) were developed academics who made observations (e.g., Jay Barney for RBV) during their interactions with practice in the form of consulting and related roles. Overall, we can state that there is some evidence to ascertain the validity and utility of these frameworks, and they can serve as one approach in building intellectual capital for the IS discipline.

It is important to note that in discussing direction above, we have largely discounted the reference discipline approach as too constraining. This comes from our framing of the problem as one involving disciplines as competitors. With such a framing, there is a natural bias to minimize the common product (p) including drawing from reference disciplines. However, we would like to point out that our logic holds if we don't simply draw from reference disciplines and use the IS context as a testing bed for reference theories. In doing this, the intellectual content belongs to the reference disciplines, and homogeneity of product prevails. Instead, if we draw from reference disciplines and reconstitute the theories by embedding them in an IS context, we can enhance heterogeneity.

5. Concluding Remarks

Identity is a complex issue, and determining the factors that affect the sustainability of the IS firm remains a significant challenge. We attempt to contribute by advancing a resource-based model for IS research. Appreciating the substantial intellectual contributions on identity crisis, we seek to complement and extend them through a resource-based perspective. As we demonstrate, the resource-based transactional perspective of knowledge can be useful for framing our thinking on forging a sustainable identity.

While we have presented a set of implications, they are derived based on a set of assumptions and logic. The contribution of this work lies more in the framing of the problem from the resource-based perspective than the specific implications. In doing this, perhaps we are only catering to the internal customer. We invite researchers to use this framing, perhaps with an alternative set of assumptions, to come to (perhaps) different conclusions. It is through these kinds of interactions that we will move beyond the current debate on disciplinary identity.

There are several important aspects that need to be explored in additional work. At a conceptual level, the abstract nature of our work, and implicit or explicit assumptions made, provides opportunities for further refinement leading to more reliable and discriminating forecasts. In particular, two important assumptions used in this article that are also common in the literature need to be more fully explored and challenged. One assumption is that a culturally diverse discipline like IS, with a multitude of goals, can indeed be managed like a firm. We would like to clarify that although this remains true to a certain extent, we have not forwarded any functionalist agenda that calls for placing narrow restrictions on our research. For us, a shared agenda can be implemented at various levels including clear definitional boundaries, description of key IS topics, inclusion of IS constructs, and more generally, an explicit recognition and awareness of the IT/IS context in our research. Simply put, our agenda really places a call for refraining from nominal research (Orlikowski and Iacono, 1991) and, thus, works in line with the cultural, social, people, and goal diversity that is characteristic of IS discipline.

A second assumption that should be explored further is the ease with which a discipline can serve both the practice and the academic community. As a discipline, IS will undoubtedly enter into intense competition with others in the practice market. How this can be accomplished should be a key issue for further research, and current approaches clearly fall short on this issue (e.g. Klein and Rowe, 2008). While we do not offer any clear suggestions concerning this point, we briefly address this issue in our policy implications framework, where some strategies are suggested to help IS serve both academic and practitioner audiences. We also ignore the process through which Y and X change product differentiation, and/or positioning effects. Further work needs to explore the aspect of value adaptation (process). This is a fertile area for further research, and interesting insights can be derived, for instance, using Nelson and Winter's (1982) evolutionary model of firm growth. Third, we focus exclusively on research as a driver of sustainability. How pedagogy affects and interacts with factors outlined here will be useful in providing a more complete picture. For instance, some have explicitly suggested how integrating research into instruction might enhance the value and visibility of work by preparing practitioners of the future (Lee, 1999; Lyytinen and King, 2004). Fourth, there exist other transactional lenses that can be fruitfully brought in to study the identity crisis in IS research. One such extension is application of institutional theory by use of Bourdieu's concept of hierarchically arranged fields and capital (Bourdieu, 1985).

Some might contend that knowledge firms (competition among knowledge firms) are not as competitive (as portrayed in this study), or do not compete as their counterparts do. This is an assumption on which our analysis is based. To the extent that this is true, we would deviate from our concepts and perhaps modify the underlying assumptions in the identity debate itself. However, regardless of the specific nature of competition; recognition of the transactional aspect of knowledge, and an appreciation of the concepts outlined in the resource-based model, we believe, will only benefit IS in terms of acquiring superior financial returns, not hamper them. In conclusion, we invite scholars to use, challenge or reframe our discussion to advance our understanding of the identity problem in order to come up with constructive and positive recommendations for the field. The road ahead is uncharted, but replete with opportunities**.**

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